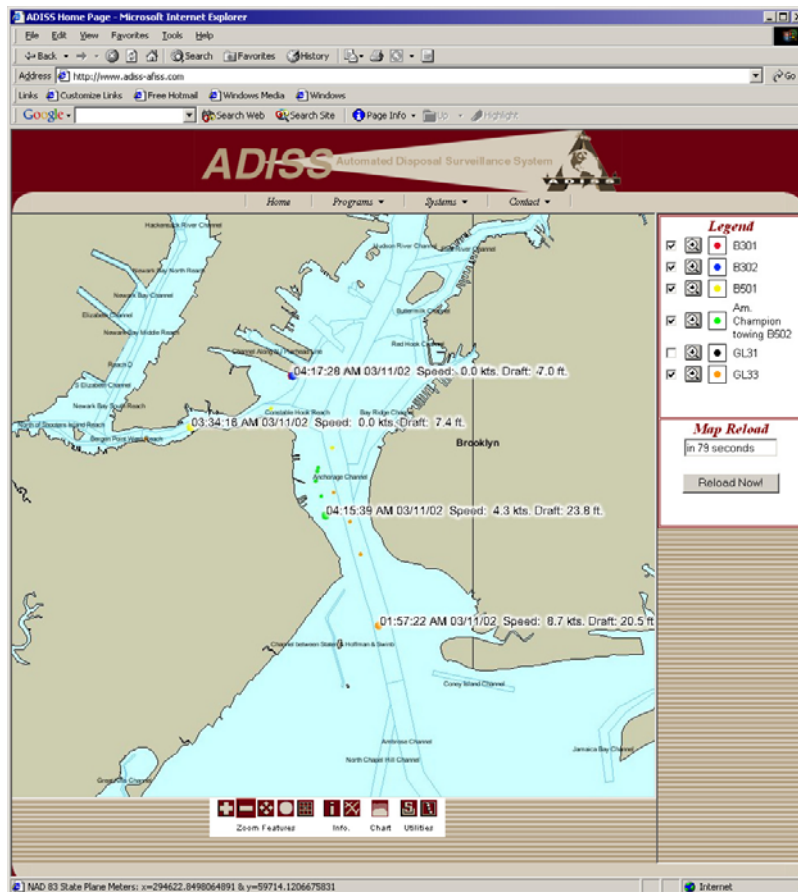

MONITORING DREDGED MATERIAL PLACEMENT OPERATIONS AT THE HISTORIC AREA REMEDIAATION SITE DURING THE KILL VAN KULL CONTRACT 7 PROJECT



Prepared by:

Science Applications
International Corporation
Admiral's Gate
221 Third Street
Newport, RI 02840

Prepared for:

U.S. Army Corps of Engineers
New York District, Operations
Division
26 Federal Plaza
New York, NY 10278-0090

October 2002

Contract No. GS-35F-4461G
SAIC Project No. 01-0440-04-9916-380
SAIC Report No. 614

TABLE OF CONTENTS

	Page
LIST OF FIGURES	iii
ACKNOWLEDGEMENT	iv
1.0 OBJECTIVES	1-1
2.0 SYSTEM DESCRIPTIONS.....	2-1
3.0 FIELD SERVICES AND DATA PROCESSING	3-1
4.0 SUMMARY AND RECOMMENDATIONS.....	4-1
5.0 REFERENCES	5-1

LIST OF FIGURES

	Page
Figure 1. Kill Van Kull Contract 7 placement at the Historic Area Remediation Site.	2
Figure 2. ADISS position and draft information displayed for viewing on ADISSWeb.	2
Figure 3. Summary of 501 placements at the Historic Area Remediation Site, Priority Area #1 during the Kill Van Kull Contract 7 Project, August 2001–July 2002.	2

ACKNOWLEDGEMENT

As with the previous Passenger Ship Terminal project, we established a working relationship with the Donjon Manager, Mr. T. Witte and with the Project Superintendent, J. Wright. Both gentlemen were informative and cooperative during the monitoring operations. We also thank Mr. E. King for his logistical assistance during the Kill Van Kull Contract 7 project.

We also express our gratitude to Stephen Knowles, the NYD HARS manager, who demonstrated patience in our efforts to improve aspects of the monitoring system.

1.0 OBJECTIVES

During the Kill Van Kull Contract 7 project, SAIC provided Automated Disposal Surveillance System (ADISS) technical support services under separate contracts to the dredging contractor, Donjon Marine, Inc., and to the monitoring agency, U.S. Army Corps of Engineers, New York District (NYD). ADISS was employed to monitor the placement of dredged material at the Historic Area Remediation Site (HARS; **Figure 1**). Under contract to Donjon, SAIC provided the equipment, software and technical expertise to maintain the systems and process the data. For NYD the objectives were to:

- Provide real-time placement and draft information, including load misplacement and scow leakage alarms;
- Acquire, process and submit information concerning potential misplaced material events;
- Post the Inspector logs on the web site; and
- Provide the placement grid used on the ADISSPlay vessel guidance for this project.

SAIC provided monitoring services to Donjon and NYD for the previous Passenger Ship Terminal project. Initial development of ADISS during the 1997 Capping Project preceded the introduction of ADISSPlay, the helmsman display and vessel guidance system. The present ADISS/ADISSPlay monitoring system was managed by SAIC for the permittee (USACE) placing dredged material within the HARS, and the installation and maintenance of the system on the dredge scows and tugboats occurred under separate contracts with Donjon.

In addition to hardware installation and maintenance, services included the daily monitoring of data transmitted via cellular telephone from the tugboats. The transmitted ADISS information was processed and made available to NYD via the ADISS web site. As ADISS data were received, they were processed for placement locations at the HARS grid and entered into the ADISSWeb (Internet Map Server) database. NYD personnel accessed the ADISSWeb plots posted on the web site, <http://www.adiss-afiss.com/>. Hardcopy plots of individual transits and vessel draft were submitted to Donjon along with summaries of placement activities. Plots and information of a potential misplacement were also provided to NYD for analysis.

The objectives of this project were based upon previous project experiences and Donjon and NYD needs. The requirement for daily monitoring was met by posting telemetered ADISS data on the Internet using ADISSWeb.

The position and draft data acquired from the ADISS installations were also provided on the Internet at <http://www.adiss-afiss.com/> for public outreach.

SAIC programmed the placement grid for the Kill Van Kull Contract 7 project shown in **Figure 1** on the ADISSPlay system for placement guidance. The NYD provided the grid coordinates and dimensions to SAIC for this purpose.

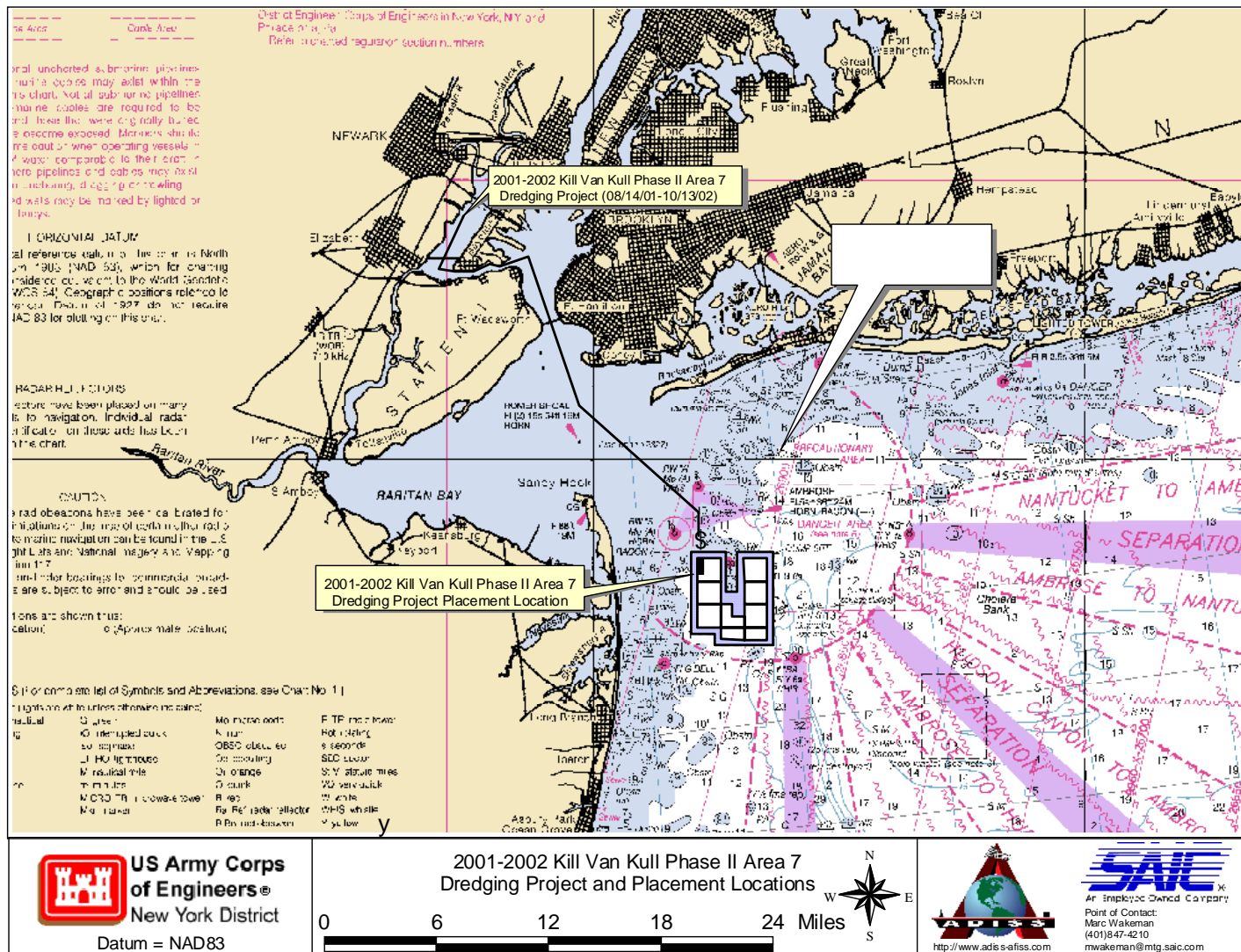


Figure 1. Kill Van Kull Contract 7 placement at the Historic Area Remediation Site.

2.0 SYSTEM DESCRIPTION

ADISS was composed of a GPS positioning and draft recording unit and a spread-spectrum transceiver for data telemetry from the scow to the towboat. Aboard the boat, ADISSPlay consisted of a helmsman display, telemetry, and an Inspector database program. The combined ADISS/ADISSPlay system was adapted for monitoring placement operations at the HARS from previous experience. In past projects ADISS/ADISSPlay relied upon VHF modem technology with varying degrees of success, depending on radio frequency interference. During the Kill Van Kull Contract 7 project, spread-spectrum modems were utilized to reliably pass ADISS data from the scows to the tugs during transit and placement at the HARS. ADISS/ADISSPlay data containing completed trips were telemetered via cell phone from the tugs to the SAIC Newport facility for processing and analysis. Processed data were posted on the ADISS web site for viewing with the ADISSWeb program.

Prior to the Kill Van Kull Contract 7 project, an alternative method of tracking scow transits and dredged material placements at the HARS was instituted (SAIC 2002a). When communications failed with the ADISS unit installed on the scow, the Inspector was able to switch to the alternative that estimated scow position from the tugboat GPS input and the layback distance to the towed scow. The alternative program, ADISSLt, could be used to track the scow until the ADISS unit was restored before the next transit took place. In addition to utilizing the ADISSLt program, the Inspector was instructed to notify SAIC of the ADISS problem, so corrective action could be taken in a timely manner.

A description of the ADISS system was available in the report of the prototype system (SAIC 1998a). The ADISSPlay system, including the Inspector Log function was described in a letter report (SAIC 1998b). The display of the ADISS data on the Internet and its availability utilizing an executable viewer were described in a project report (SAIC 1999). A summary description of the ADISS/ADISSPlay system and access to the processed data was provided in the CY 2000 and CY 2001 summary reports (SAIC 2001 and SAIC 2002b).

ADISS consisted of GPS and DGPS receivers, antennas, a high-speed logger, flash-ram memory, a small 12-volt battery, solar charger, a pressure sensor and a spread-spectrum modem. The firmware enabled the logger to determine vessel draft from the pressure sensor, proximity to the placement target, and accidental disposal outside the boundaries of the target. The modem was used to transmit data and receive new setup instructions, remotely. ADISS operated unattended: The solar charger provided the system with a renewable energy source, and ADISS automatically transmitted scow transit and placement locations at the HARS.

During the Kill Van Kull Contract 7 monitoring project, the Internet display of placement events was maintained to monitor daily disposal activities without visiting the installations to retrieve the stored data for each event. The cellular telephone data transmissions that were received from ADISSPlay were automatically plotted and posted on the ADISS Web Site using ADISSWeb. **Figure 2** shows the ADISSWeb display of data available at <http://www.adiss-afiss.com/>.

The purpose of the remote reporting and automated e-mail alarms was to provide NYD with a means of detecting leaking scows and potential misplacements outside the permitted area quickly

without deploying technical personnel in the field to recover the data. By monitoring the Internet, misplacements could be detected several days before processed ADISS data could be retrieved and provided to NYD.

Data processed from the transmitted ADISSPlay database were plotted on a weekly basis at SAIC and submitted to the dredging contractors within a few days in a hardcopy report.

After the completion of the project, SAIC produced plots of the transit and draft data, and posted them on the ADISS web site, <http://www.adiss-afiss.com/> for public outreach. In addition to the graphics, access to this report was also made available to the public on the ADISS web site in '.pdf' format.

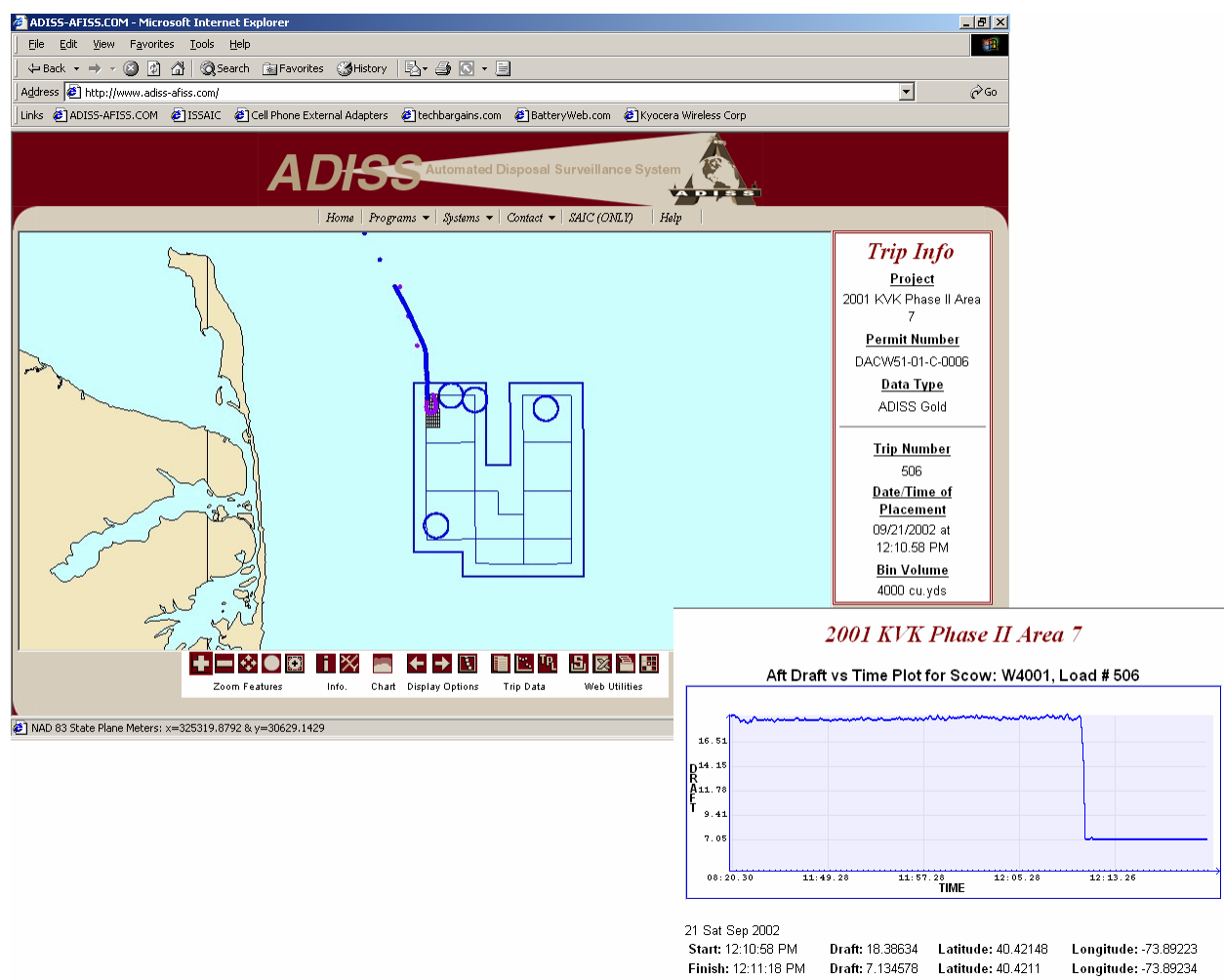


Figure 2. ADISS position and draft information displayed for viewing on ADISSWeb.

3.0 FIELD SERVICES AND DATA PROCESSING

The Kill Van Kull Contract 7 project began on August 14, 2001, when Donjon shipped the first load of dredged material to the HARS. ADISS units were initially installed aboard scows *W-4001*, and *W-4002*. Latter during the project, ADISS units were added to the scows *N-4002* and the *Eddy Carol*. The ADISSPlay unit was installed aboard the tug boats *Mary Alice* and *Salvor*. In total, four scows were used with two tugs over the eleven-month project.

ADISS/ADISSPlay successfully monitored over 97% of all 501 placements. Nine trips were recorded with the ADISSLt version of the tracking software, when the Inspector was unable to establish communications with a scow. In these cases, the alternative ADISSLt program was initiated, and the alternate program estimated scow position from the GPS position acquired from the tug and the layback distance to the scow. Without draft information, ADISSLt depended on input from the Inspector to mark a placement event. Once the scow communications were re-established by SAIC engineers, ADISSPlay was restored to the default values, and the scows were tracked directly from ADISS signals aboard the scows.

Plots of each placement and draft record are available on the ADISS Web Site (<http://www.adiss-afiss.com>), and are accessed by choosing a trip number. All show the accurate placement within the designated target grid. **Figure 3** is a summary plot of all 501 recorded trips. The red clay dredged from the Kill Van Kull Contract 7 project contained no significant volumes of water, increasing the disposal time over the target cell to minutes instead of seconds. Since the tug maintained control of the tow by ‘making way,’ a prolonged departure of the load from the scow meant the contents were not always deposited within the target cell boundaries.

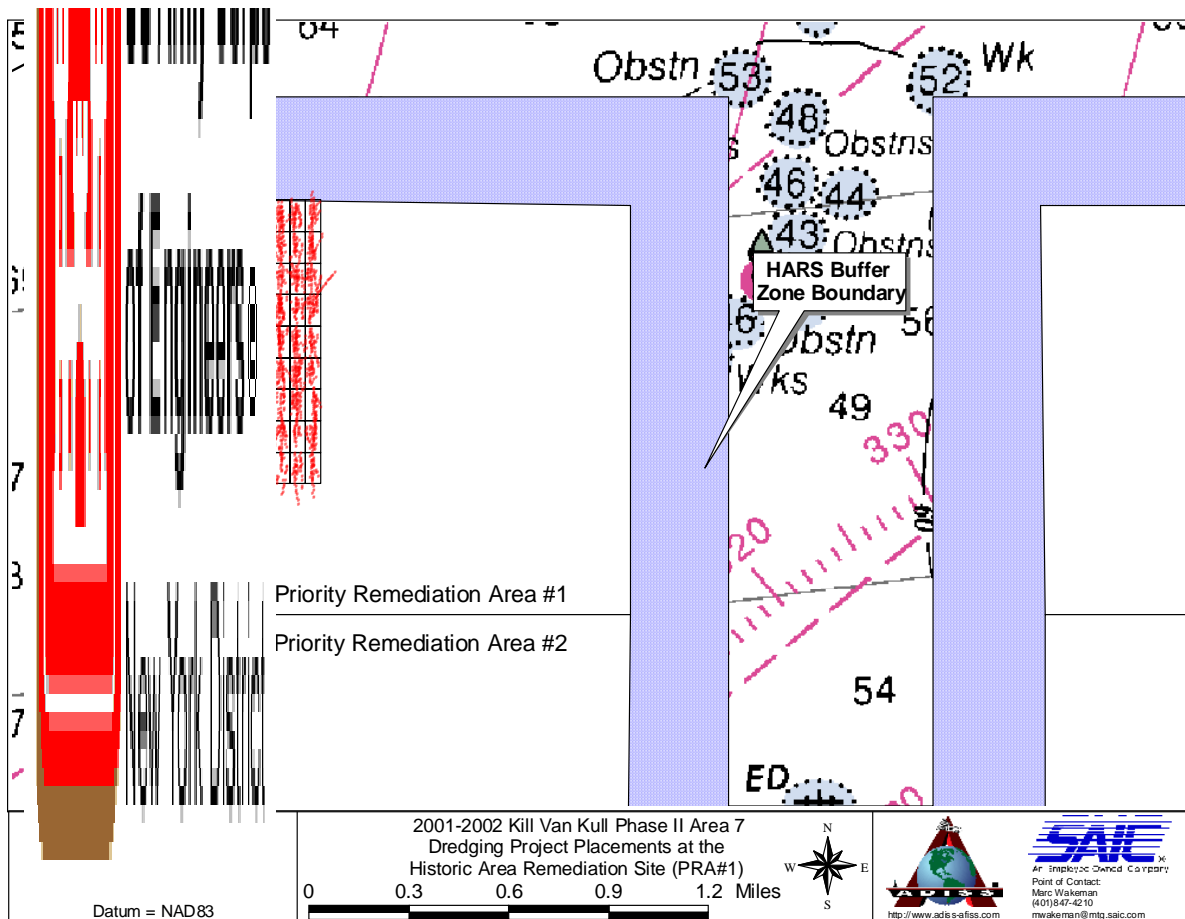


Figure 3. Summary of 501 placements at the Historic Area Remediation Site, Priority Area #1 during the Kill Van Kull Contract 7 Project, August 2001–July 2002.

4.0 SUMMARY AND RECOMMENDATIONS

The following summarizes the results of monitoring the placement operations at the HARS during the Kill Van Kull Contract 7 Project:

- ADISS units aboard two scows recorded over 97% of all 501 placements, and ADISSPlay recorded over 97% of all transits to the HARS.
- The ADISS/ADISSPlay-telemetered data provided near real-time updates on the Internet of daily placement activities to NYD using the ADISSWeb program. The method utilized cellular technology to transmit the data file containing each transit and placement.
- The use of cellular technology also allowed remote trouble shooting of ADISSPlay and remote training of Inspectors. ADISS technicians rectified a few errors during the project by remotely manipulating the ADISSPlay computers onboard the tugs from the SAIC Newport facility. This saved the project data and significant transit time to the site.
- Plots of placements and draft records were posted on the Internet for public outreach.
- Revised the existing ADISSWeb program to allow NYD to
 - Automatically post incoming ADISS data prior to QA processing
 - Color-code the automatically posted data to distinguish it from the QA data.
 - Receive an automated e-mail warning of scow misplacement or leakage
- Transmitted the Inspector log information along with the ADISS data for Internet distribution
- Utilized the Transportation Placement Log (TPL) check list as part of the inspector duties for shipping each scow.
- Temporary utilization of ADISSLt was instituted until ADISSPlay operation was restored.

The following recommendations are suggested to improve HARS management operations:

- Assign trip numbers from a land-based control point, and avoid confusion between multiple tugs and Inspectors.
- Change the method of data transmittal from the tugs to a string-based method, and improve the communications link and performance.

5.0 REFERENCES

- SAIC. (1998a). New York Disposal Surveillance System: Prototype Description. Report 72 of the New York Mud Dump Site Studies. USACE-WES, Contract DACW39-94-C-0117. SAIC Report No. 421.
- SAIC. (1998b). Letter report to Mr. Brian May, USACE-NYD, presenting the deliverables for the project, ADISS Management Tools for HARS Disposal Operations. November 6, 1998, from Mr. Steve Pace, Project Manager.
- SAIC. (1999). Automated Surveillance of Disposal Operations during the 1999 Passenger Ship Terminal Project at the Historic Area Remediation Site. Report 93 of the New York Mud Dump Site Studies. USACE-CENAN, Contract No. DACW51-97-D-0014. SAIC Report No. 471.
- SAIC. (2001). Monitoring Dredged Material Placement Operations in the New York Bight during Ten Dredging Projects. USACE-CENAN, Contract No. GS-35F-4461G. SAIC Report No. 519.
- SAIC, (2002a). Monitoring Dredged Material Placement Operations at the Historic Area Remediation Site during the Passenger Ship Terminal Project. USACE-CENAN, Contract No. GS-35F-4461G. SAIC Report No. 587.
- SAIC, (2002b). Monitoring Dredged Material Placement Operations in the New York Bight during Eight Dredging Projects. USACE-CENAN, Contract No. GS-35F-4461G. SAIC Report No. 576.